# THE FIRST TIN MINE DEVELOPMENT IN NORTH AMERICA

Two Ottawa professors have discovered in New Brunswick what could become the first tin mine in North America. They are John Evans Riddell, 49, formerly head of the geology department at Carleton University, and Dr. William Lee Young, 36, formerly chairman of the department, and they are confident a block of 500 claims they began staking in 1959 could become an important producer in this tin-scarce world.

Dr. Riddell, president and managing director of the company—Mount Pleasant Mines Limited—first became interested in the site, 70 miles south of Fredericton, in 1954. He was on the faculty of McGill University at the time and during the summer he and two American and one English professor were carrying out mineral exploration work in the New Brunswick hinterland for an English firm. Using a new technique whereby stream gravels, silts and sand were analysed chemically for valuable minerals, they made a number of finds, the first of which was Mount Pleasant. But this was not recognized as a tin prospect at the time and interest in it lapsed.

Four years later, he and Dr. Young, by then both on the faculty of Carleton University, decided to explore the property further. Dr. Young brought in Nickolas Axiotis, an American contractor and amateur prospector for whom he had done consulting work. Mount Pleasant was restaked and a company formed to develop it on the possibility that tin mineralization might be present. Early findings indicated the presence of a previously unsuspected tin-bearing belt and as well, deposits of tungsten, molybdenum and bismuth.

Mount Pleasant Mines Limited is listed on the Vancouver Stock Exchange and the Canadian Stock Exchange, Montreal.

In 1961 an agreement was entered into with Kennco Explorations (Canada) Limited, an affiliate of Kennecott Copper, to explore the property on a partnership basis. After a year this agreement was terminated and a new agreement entered into whereby Mount Pleasant Mines regained control of the original group of 100 claims, and optioned 31 claims acquired by Kennco during exploratory work.

Preliminary ore dressing studies carried out by Kennco gave very satisfying results and in 1961 investigations were undertaken by Dr. Kenneth Hosking, consulting geologist of Cornwall, England. On the basis of his findings, it was decided to drive an adit (tunnel) into the north side of the mountain to investigate further the type of ore bodies revealed by drilling.

As of September, 1962, approximately 47,500 feet of diamond drilling had been completed on wooded Mount Pleasant. The 2,200 foot adit had been completed and a drive along the No. One Lode, at a depth of 300 feet below surface, is in progress. Several new zones of tin mineralization were discovered in the adit.

The company foresees a milling rate of more than 2,000 tons of ore per day, with a pilot project of 200-500 tons per day as a target. Initially, the tin concentrates may have to be sent abroad for metallurgical treatment. But the company, through its affiliate, Geo-Met Reactors Limited, is carrying out a research program to develop metallurgical methods based on a process patented by the Pulp and Paper Research Institute of Canada, for processing complicated ores at greater speed and lower costs.

Geo-Met Reactors, in which Mount Pleasant has a 36 per cent interest, is another project which Dr. Riddell helped to organize. Set up as a private research company, it is expected to pay off in research done for mining companies, on a fee and royalty basis.

Indications are that Mount Pleasant may be a big mine. It is the first significant discovery of tin in the last fifty years and represents the first substantial amount of potential tin ore in North America.

Present major sources of tin are Malaya, Bolivia and Nigeria, but it appears that these countries have passed the peak of production. Because of the ever-increasing demand for tin, both in the older economies and in newly-developing countries of the world, tin has become in short supply. Last year the demand in non-Communist countries was about 15 per cent greater than the supply. Commenting on this, the Financial Times of London states: "The plain fact is that the world must accustom itself to a permanent shortage of tin." Thus, any new development is important, especially in North America where virtually all tin ore is imported, with an approximate value of 100 million dollars a year.

About two-fifths of the primary tin consumed in the world is used in the manufacture of tinplate. The can-making industry takes the great bulk of tinplate production and also considerable amounts of tin in the form of solder. Leading consumer is the United States, and second position has now been taken over from the United Kingdom by West Germany which, together with Japan, has rapidly increased consumption in the last few years. Canada runs about sixth.

Though this is not widely known, tin is a valuable metal, its present market price in bar form being in the $1.00-$1.25 per pound range—four times the price of copper.

# MOUNT PLEASANT MINES LIMITED

# REVIEW OF PROGRESS (1959-1962)

Over $750,000 was spent by Mount Pleasant Mines Limited on development of their property in Charlotte County, New Brunswick, between May, 1959 and July, 1962.

This amount covered a series of primary geological surveys, reconnaissance geochemical soil surveys, followed by detailed geochemical and geophysical surveys, exploratory diamond drilling and underground development.

The work included about 60,000 soil sample analyses 117,000 feet of geophysical survey, 47,444 feet of diamond drilling and 2,409 feet of underground development, and preliminary studies on ore concentration and metallurgy.

Underground development was started in February, 1962. The program called for driving a tunnel (adit) some 2,200 feet into the side of Mount Pleasant to intersect the mineralized zone previously drilled on surface at an average depth of 300 feet. The direction of the drive was south 30 degrees east.

By mid-July, 1962, the adit intersected its objective, Number One Lode, and the direction of the heading was turned some 30 degrees west to crosscut the formation at right angles. In August, approximately 118 feet of crosscut had been completed across the Number One Lode and three parallel ore shoots of 10, 16 and 12 feet in width had been intersected. By mid-November, the adit intersected Number Three Lode 150 feet further south. Both lodes show a heavy fracture pattern and kaolinization common to economic tin deposits throughout the world.

Car and face samples have assayed up to four and one half per cent tin oxide ($SnO_2$), with individual grab samples assaying up to 27 per cent. The fracture zone contains coarse visible cassiterite and a marked decrease in the black sphalerite found in the lower grade tin-bearing zones.

The objective of the present underground program was to develop from the adit level—by means of drifts, crosscuts and raises—a sufficient length of the Number One Zone so that a true comparative picture between drill results and underground sampling could be established.

As of November, a 600 foot length of Number One Lode had been developed and pattern diamond drilling commenced. During the intensive underground development of Number One Lode, a more moderate underground program will be in progress on the mineralized zones lying north of Number One Lode, and on Number Three and Number Five Lodes lying to the south.

Mount Pleasant Mines is a large property consisting of 560 claims. The zone under active underground development consists of a small part of the total acreage known as the North Zone. In addition to this, a limited surface diamond drill program has indicated an equally important Fire Tower Zone, lying approximately 5,000 feet south of the North Zone. The present underground program calls for a Number Two adit to be driven into this area. A further tin-bearing structure has been indicated by surface drills lying between 4,000 to 12,000 feet east of the present Number One Lode underground workings. The South Zone, located 1,000 to 3,000 feet south of the Fire Tower Zone, is also being developed.

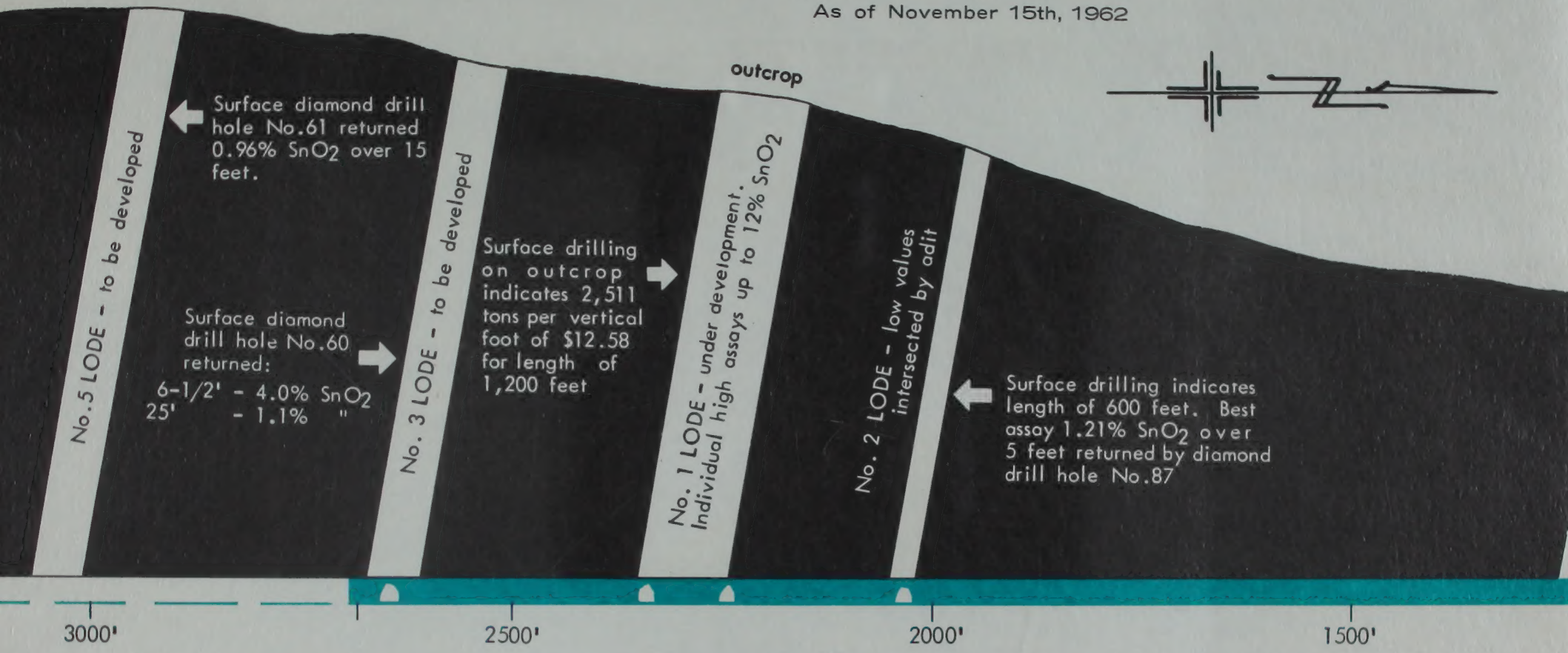
Aside from the drilled areas there are a number of geochemical anomalies for tin and other base metals that have been located during surface prospecting and are awaiting further investigation.

The company presently employs fifty persons at the mine site including geologists, engineers, miners and diamond drillers. There are adequate facilities at the mines site and at St. Andrews, N.B., to carry out the present development program.

The company has sufficient funds remaining in the treasury to establish the ore reserve picture in the North Zone and to carry the metallurgical investigation to a pilot plant operation at Mount Pleasant.

# SECTION through ADIT showing LOCATION of LODES
## (north main zone only)

As of November 15th, 1962




The following is a brief discussion of the probable mining rate costs and profits as indicated at the Mount Pleasant Mines property.

At this stage of development it is not possible to speak of ore reserves as qualified in a mine operating picture but only as ore reserves and ore potentials as indicated in surface diamond drilling.

## ORE RESERVES

In discussing the ore reserves it is pointed out that only the No. 1 Lode of the North Zone has been fully drilled from surface. But there are four additional lodes namely 2 to 5 inclusive indicated by one or more holes in each and all making up the North Zone. The South or Fire Tower Zone lies some 5,000 feet south and is not included in this study.

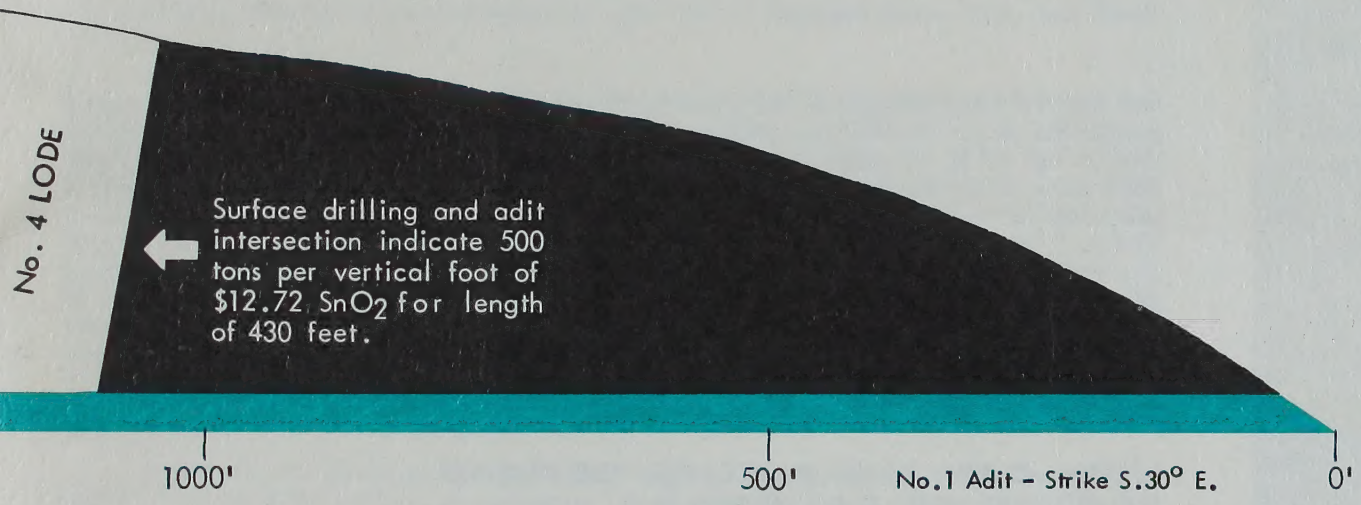
In addition to the above zones there are a number of anomalies on the property still to be investigated. The geochemical indications show these anomalies to contain molybdenum, zinc, copper and tungsten.

For the purpose of this study a preliminary estimate of the tonnage of the North Zone only is being considered.

A calculation of the ore reserves, from the surface diamond drilling in No. 1 Lode

# ENGINEER'S REPORT: FULL TEXT OF REPORT SUBMITTED SEPTEMBER 13th, 1962

*by* T. R. CLARKE, *Consulting Engineer, Mount Pleasant Mines Limited*




indicates a potential of 5,211 tons per vertical foot grading 0.37% $SnO_2$ and 1.79% zinc with other metal values in tungsten, lead and copper. An additional potential of 5,200 tons per vertical foot is being assumed for lodes Nos. 2 to 5 inclusive lying in the vicinity of No. 1 Lode.

On this basis the assumed potential of the North Zone is 10,400 tons of ore per vertical foot grading approximately $12.28 a ton (Canadian) at present prices.

## MINING RATE

To establish a mining rate allow for a depletion of one level or 120 feet a year and assume an 80% recovery of rock underground.

Annual tonnage

$$120 \times 10{,}400 \times \frac{80}{100} = 998{,}400 \text{ tons a year}$$

$$= 3{,}250 \text{ tons a day}$$

## MINING COSTS — ESTIMATED OPERATING COST

For this study it is assumed that mining will be carried out through two shafts. The production will be through a cable-conveyor-equipped inclined shaft and servicing from a vertical shaft. Mining will be a variation of long hole drilling and open sub level stopeing. Loading will be by both slusher and drawpoint mucking machines. Primary crushing will be carried out underground by hydraulic breakers.

*On this basis the mine operating costs are estimated as follows:*

| | Cost per Ton |
|---|---|
| Administration & Engineering | $0.175 |
| Head Office | 0.150 |
| Surface & Shops | 0.150 |
| Underground Supervision | 0.060 |
| Drilling & Blasting | 0.170 |
| Loading & Conveyance | 0.125 |
| Compressed Air & Hoist | 0.095 |
| Mine Miscellaneous | 0.060 |
| Power | 0.170 |
| Diamond Drilling | 0.025 |
| Backfill | 0.120 |
| Stope preparation & Mine Develop. | 0.650 |
| Total operating per ton | $1.95 |

The preproduction cost is estimated at $0.25 per ton developed and capital equipment at $0.20 per ton developed.

# A BRIEF REVIEW OF THE TIN RESOURCES OUT

In view of the fact that the United States, which is the world's largest consumer of tin (accounting for about 30 per cent of the whole), produces virtually none of this metal and because, for four years, the free world has consumed more of this metal than she had produced, it is pertinent to consider briefly to what extent the mining industry can satisfy the demands for tin in the foreseeable future.

A country's standard of living can broadly be gauged by the quantity of tin "used" per person per year. This is because a very large proportion of the tin is employed in the production of tin-plate and most of this is used in the production of tin cans. As the tin can is unlikely to be generally replaced by a container made of another material, and as many African and Asian countries are striving after a standard of living approaching and similar to that of the North American and western European countries, it is reasonable to believe that the tin consumption will show, for a long time at least, an upward trend. This upward trend will, doubtless, be further increased by the development of new tin alloys and by the synthesis of many more organotin compounds: already some of the latter have been shown to possess properties of considerable economic importance.

## TIN RESERVES OF THE PRODUCING COUNTRIES

All of the major tin producers are, with the possible exception of Thailand and the Congo, past the peak of their production, and with very few exceptions, the minor producers are unlikely to achieve markedly higher production as the result of new discoveries. Malaya, the world's largest producer, recovers most of her tin by dredging placers, but no new deposit of any merit has been discovered there since before the Second World War. Indonesia, an extremely important producer, is searching for new off-shore alluvial deposits but is unlikely to make new major discoveries. Thailand, however, has offset the closure of some of her tin mines by the discovery of important deposits off the coast of Phuket. Bolivia has failed to find any new hard-rock deposits for many years, but of course, intensive prospecting might be rewarding. Many of Nigeria's more easily worked alluvial deposits are reaching exhaustion and although she probably has important reserves of unknown magnitude, in certain valleys buried beneath flows of basalt, as yet no adequate method has been developed for working or evaluating them.

## HOW CAN THE FUTURE DEMAND FOR TIN BE SATISFIED?

The above data invite the question, "How can the future demand for tin be satisfied?" The answer is that it *can* only be satisfied if much more complete "tapping" of unknown reserves is resorted to, and if large new deposits are discovered. Stated in another way, the tin will have to be obtained as follows:

1. By the much larger recovery of "used" tin.
2. From tailings of hard-rock and placer deposits.
3. From known "natural" deposits now regarded as sub-economic.
4. From new deposits discovered in and adjacent to old fields.
5. From new fields.

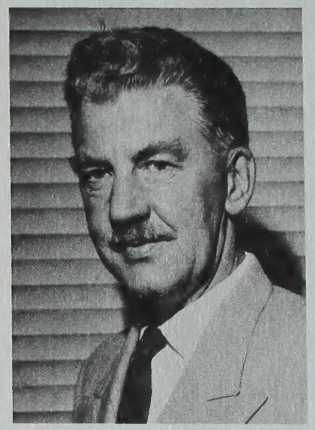
Whilst the grade of ore that can be mined economically at any given time must depend ultimately on the price offered for the metal, it is unlikely that this will ever be sufficiently high for some of the potential forces to be tapped unless revolutionary recovery methods are developed.

# SIDE THE SINO-SOVIET BLOC

*by* Dr. K. F. G. HOSKING, M.Sc., Ph.D., M.I.M.M.
*Senior Lecturer in Economic Geology, Camborne School of Mines, Cornwall, England*
*(Text of Remarks delivered September 6th, 1962 at Overseas Press Club, New York)*

If a new technique for recovering tin were available which required sulphides as fuel to obtain the necessary heat for the reaction to be effected, complex sulphide-rich tin-ore would be the ideal source. A method of tin recovery from low-grade ore which depends on the employment of the Geo-Met Reactors and which uses sulphides as fuel is in the process of being developed by Dr. W. A. Morgan of Ottawa. If Dr. Morgan's work is successful his technique will be a major break-through in the field of extraction metallurgy, and it will go a long way towards converting many of the low-grade tin deposits of the world into ore. A detailed discussion of the possibilities of discovering new deposits in, and adjacent to, old fields is beyond the scope of this review. It is sufficient to say that it is probable that a considerable untapped potential exists in such places which can be located without undue difficulty provided funds are available to make possible the use of all the modern explorations techniques. Some of the off-shore areas of Cornwall, England are certain to contain tin deposits which fall into this category.

Obviously the discovery of a large new tin province would be of major importance, and it would be of the greatest advantage to North America, were it located on that continent. Extensive reconnaissance surveys have demonstrated that a tin province, extending from Maine to Cape Breton Island, does exist, but what its economic potential is remains to be seen: that will only be determined by intensive investigation in which virtually all the modern aids available to the explorationist are used. However, already at Mount Pleasant (Charlotte County, N.B.) extensive surface and underground exploration has indicated the presence of tin deposits which are probably extensive and of economic grade. As exploration work is progressing so the tin potential of the area is increasing, and recently exceedingly rich ore was intersected by the exploratory adit (tunnel) which has now been driven in excess of 2,000 feet. In the northern part of the property, where the adit has been driven there are, in addition to the tin, considerable quantities of zinc, and not inappreciable amounts of lead, copper, antimony, fluoride and tungsten. The southern portion of the property which has not yet been investigated to anything approaching the same extent as the North has already yielded data suggesting that it has a tin potential at least equal to, and probably greater than, that of the North. In addition, the southern area almost certainly has a considerable molybdenum and tungsten potential.



**Dr. K. F. G. HOSKING**
*Consulting Geologist, Mount Pleasant Mines Limited*

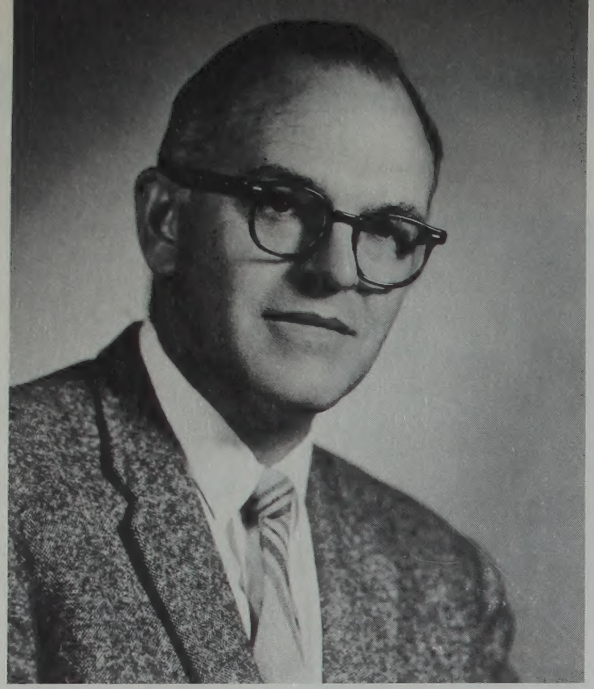
Dr. K. F. G. Hosking is considered one of the world's leading authorities on the geology of tin deposits. He is a senior lecturer in economic geology at the Camborne School of Mines, Cornwall, England, and for the past 12 years has also engaged in consulting practice for mining companies in Malaya, Siam, Nigeria, Rhodesia, Portugal and Spain. Most of this work has been concerned with tin deposits.

Dr. Hosking holds a Master's Degree in Economic Geology and a Ph.D. from the University of London. He is a member of the Institution of Mining and Metallurgy, and the Mineralogical Society of Britain. He has published a number of papers on tin geology, and on geo-chemical prospecting, with particular reference to the search for tin and associated metals.

Dr. Hosking is married and has two sons, John 21, a mining engineer, and James, 10, who is still at school in England.

Dr. Hosking's father was a mining engineer, and both sides of his family have been engaged in mining and associated work for several generations.

His recreational activities include cricket—a favorite—field hockey, soccer and fencing.



## DR. JOHN EVANS RIDDELL

*President and Managing Director*
*Mount Pleasant Mines Limited*

Dr. John Evans Riddell, 49, has devoted his non-academic career to mining and geological exploration. A Montrealer, he graduated from McGill University with a Bachelor of Engineering degree in mining in 1935, gaining his Master of Science degree in geology the following year.

He then became mine surveyor for Union Corporation, in Johannesburg, South Africa, for two years, returning to Canada just prior to the war to become field engineer in exploration with Dome Mines Limited, South Porcupine, Ontario.

During the war he was flight lieutenant, air crew, in the Royal Canadian Air Force, and served overseas in Britain and Italy.

He returned to McGill University as associate professor in 1949, received his Ph.D. in geology in 1953, and was appointed professor of geology and chairman of the Department of Geology at Carleton University in 1958.

In 1961 he became president and managing director of Mount Pleasant Mines Limited.

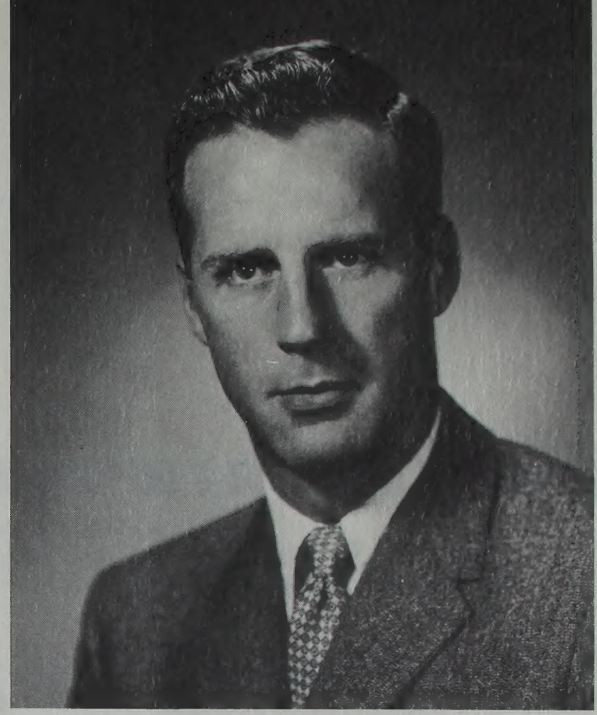
In addition to his efforts leading to the recognition of Mount Pleasant as a potential tin-bearing area, Dr. Riddell was closely associated with the discovery, in 1955, of the Portage-Charlotte Lake deposits, a group now controlled by New Jersey Zinc Corporation. He was also closely associated, in 1960, with the recognition of the Tynuagh area, County Galway, Ireland, in which Northgate is located, as a district of important base metal potential.

Dr. Riddell is also a director of Mount Costigan Mines Limited, Ottawa, a mining exploration company; Geo-Met Reactors Limited, Ottawa, engaged in ore smelting and metallurgical research; and International Geochemical Associates Limited, Ottawa.

He is a fellow of the Royal Society of Canada, the Geological Association of America, and the Geological Association of Canada. He is a member of the Canadian Institute of Mining and Metallurgy, American Institute of Mining and Metallurgical Engineers, and the Geochemical Society.

Dr. Riddell is a man of wide recreational interests—he likes sailing, flying, riding and skiing.

He is married to the former Helen Joan Archibald, and has five children, John 22, Joanne 21, Michael 20, Edward 16, and Christie 11.



## DR. WILLIAM LEE YOUNG

*Director,*
*Mount Pleasant Mines Limited*

Dr. William Lee Young, 37, is a director of Mount Pleasant Mines Limited, and was closely associated with Dr. John Evans Riddell—Mount Pleasant's president—in the early exploratory work that led to the discovery of the tin deposit. The two men were responsible for founding the mine.

Dr. Young has specialized in geological research and mining. After receiving his Ph.D. in geology from McGill University in his native Montreal in 1953, he became exploration geologist with Union Carbide Carbon Corporation, New York, and went to Portuguese West Africa and Turkey on exploratory work.

Returning to Canada in 1955, he was appointed managing director of Shield Mining Surveys Limited, Ottawa, a mining consulting organization.

In 1957, he became assistant professor of geology at Carleton University, Ottawa, and in 1962, was promoted to associate professor. He is presently on leave of absence.

He was appointed president and managing director of Mount Costigan Mines Limited, Ottawa, in July 1962. He is also a director of Geo-Met Reactors Limited, Ottawa, a research organization affiliated with Mount Pleasant Mines.

During the war Dr. Young served in the Royal Canadian Air Force in Britain, France, Holland and Germany, and was discharged with the rank of flying officer.

He is a fellow of the Geological Association of Canada, and a member of the Canadian Institute of Mining and Metallurgy.

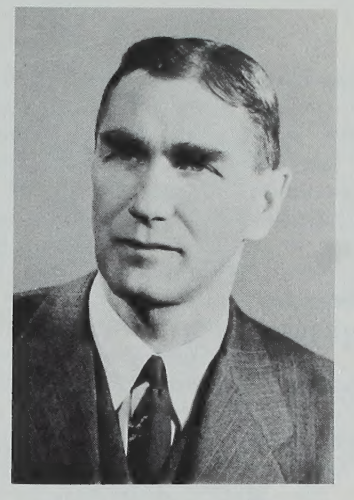
He is the author of papers entitled "The Geology of Tanner and Bennett Townships, Ontario", and "Michipicoten Iron Ranges".

Dr. Young's chief recreations are sailing and golf.

He is married to the former Marian Elizabeth Peers of Montreal, and has two children, William Lee, eight, and Joanne Peers, six.

## ALEXANDER H. TAIT

*General Manager,*
*Mount Pleasant Mines Limited*



Operation of Mount Pleasant Mines in New Brunswick, has been placed in the widely-experienced hands of 51 year-old Alexander H. Tait. A graduate in Mining Engineering from McGill University in 1937, he has managed mine operations in many parts of Canada.

Starting as a miner, and later becoming a mine surveyor and geologist at the Hollinger Consolidated Gold Mines at Timmins, Ontario, in 1932, he returned to university in 1936 to get his Bachelor of Engineering degree. He was then appointed mine superintendent at Cournor Gold Mines, Limited at Perron, Quebec.

In 1941 he became mine development superintendent at Malartic Goldfields, at Malet, Quebec, later moving to the Aluminum Company of Canada's plant at Arvida as reduction plant supervisor.

In 1945 he was appointed manger of Mistassini Explorations Limited, also at Arvida, a company engaged in prospecting and exploration.

His other managerial experience includes 10 years as mine superintendent and manager of mine operations at Quebec Iron and Titanium Corporation, at Harvest Pierre, Quebec, and for four years as superintendent and geologist with the Quebec Cartier Mining Company, Limited, at Port Cartier, Quebec. While there, he was an alderman of the town and chairman of the school board.

He is a fellow of the Geological Association of Canada, and a member of the Canadian Institute of Mining and Metallurgy. He is vice-chairman of the Seven Islands branch of the institute.

He is also a member of the Corporation of Professional Engineers of Quebec.

He is married to the former Ethel Patricia Holliday, of Montreal, and has four children, Sandra 22, Phyllis 20, Gordon 16, and Catherine 13.

For recreation he rides, curls, fishes, skiis and works in his garden.

# GEO-MET REACTORS LIMITED

Geo-Met Reactors Limited, Ottawa, was formed in 1960 as a research and development organization specializing in problems relating to the extraction of metals from ores and for the advancement of metallurgy. It has established a pilot plant and is setting up laboratory facilities. Present staff includes eight professional metallurgists and eight technicians, plus administrative personnel, and plans call for a full staff of 15 metallurgists and 20 technicians.

The broad policy of the company is devoted to developing commercial production of metals from the initial idea stage to the setting up of pilot production plants. It can produce metals in Canada as cheaply as anywhere else in the world.

Geo-Met is dedicated to Canadian research activities and to the establishment of Canadian processing plants for ore mined in Canada, to take advantage of new government legislation in relation to tax incentives for research and new product development.

As an example of its enterprise, the company is the first in Canada to produce on a commercial scale ferro-columbium, a metal used in steel production that increases the yield strength of steel by about 20 per cent.

In the past year Geo-Met has processed 20 tons of ferro-columbium, worth about $6,000 a ton after processing, for Metallurgical Products Company Limited, Montreal. This firm sells the metal to the Steel Company of Canada, Atlas Steels, Fahralloy Canada Limited, and exports it to steel firms in England, South Africa and to the Arbed steel group in Belgium and Luxembourg.

St. Lawrence Columbium and Metal Corporation, Oka, Quebec, was the first company in North America to mine columbium ore. Now this ore is also being processed in Canada—by Geo-Met Reactors Limited.

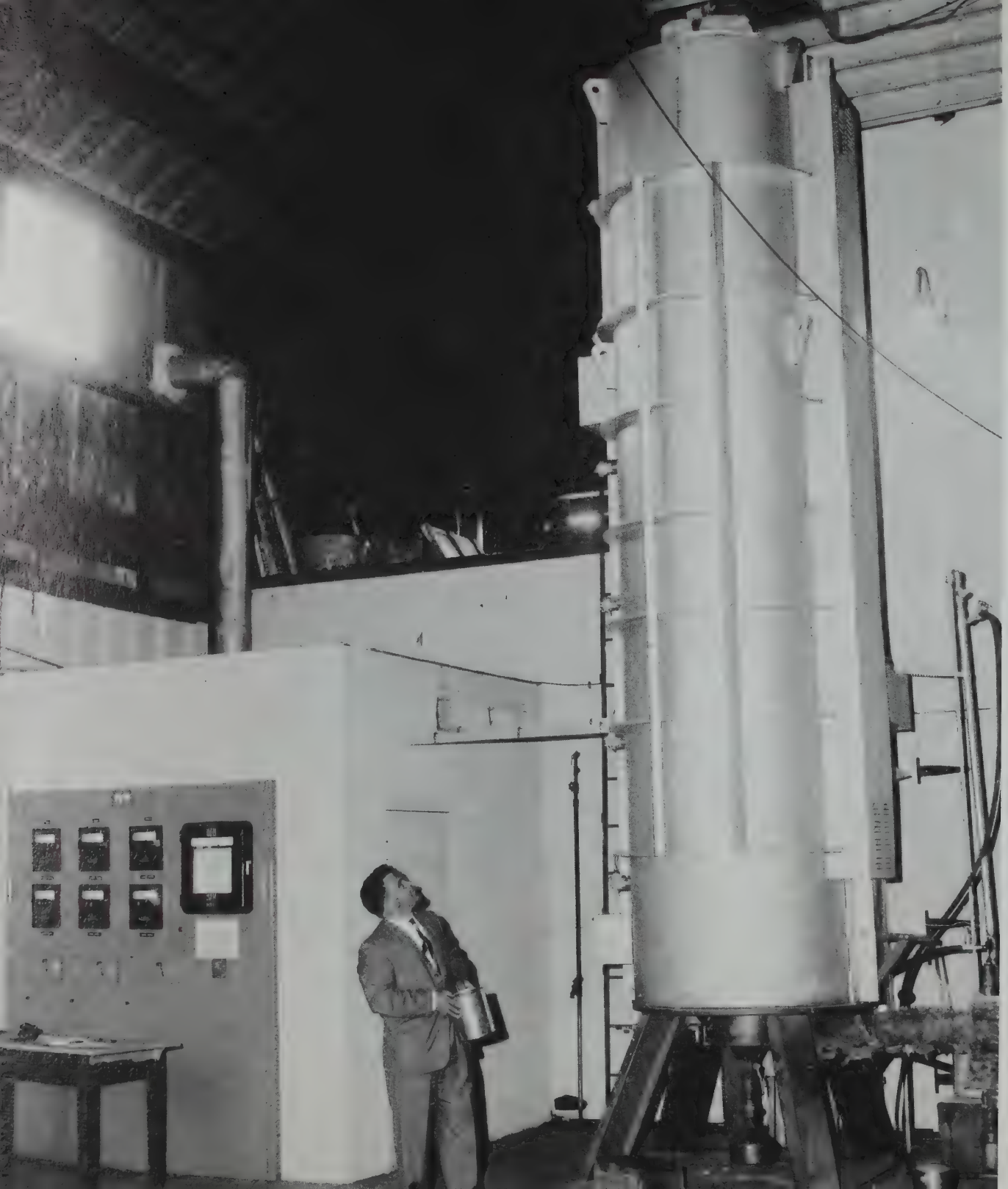
The firm is also processing tin ore for Mount Pleasant Mines Limited, an affiliate company which may become the first major tin mine in North America, located in New Brunswick. Geo-Met is also developing methods for the economic extraction of tin from the difficult ores of Bolivia and Australia.

It has also signed a contract with Nor-Acme Mines Limited, Toronto, for the extraction of gold from tailing piles at Snow Lake, Manitoba.

Research on Arsenopyrite gold tailings from other companies is being conducted at Geo-Met.

The Defence Industrial Research Department of the Defence Research Board, Ottawa, has awarded Geo-Met a contract for developing methods for the production in Canada of high-grade ferro-alloys for use in the steel industry.

The resources and facilities of Geo-Met are available to carry out sponsored research for industry and the company will tackle any problem in the mineral and metallurgical fields.



## What is AST and how does Geo-Met use it?

Geo-Met uses the Atomised Suspension Technique with certain modifications for the production of tin from high and low grade tin concentrates. This method allows tin to be economically produced from tin ores that would normally give only a low recovery on concentration. It also makes the mining of small tin ore deposits a commercially successful operation.

AST was invented in Canada by Dr. William H. Gauvin, and developed and patented by the Pulp and Paper Research Institute of Canada.

The principle consists of chemically reacting liquid droplets or solid particles with one or more gases. The tin concentrate or oxide from the mine is finely powdered—atomised—and injected into the top of an enclosed tower, the reactor, at the same time as hydrogen is released into the tower. The tower is heated by an annular-type furnace. The hydrogen reacts with the tin oxide, removes the oxygen to form water, and tin is left behind.

The AST method allows Mount Pleasant Mines Limited to recover better than 80 per cent of the original tin content of the ore from low grade concentrates. By conventional techniques, which have to use high grade concentrates, only about 50 per cent is recoverable.

OTHER ADVANTAGES OF AST:

- High speed of extraction—less than one minute is required for the ore to pass through the reactor.
- Low capital cost.
- Portability—the reactor can be economically dis-assembled and re-assembled at another location.
- The process can be started and stopped at short notice.
- Low maintenance cost.
- Low operating cost. The reactor can be thermally self-sufficient under certain conditions when in operation.

The uses of AST are developed and applied by a team of mineral and metallurgical experts.

## DR. WILLIAM AUSTIN MORGAN

*President and Managing Director, Geo-Met Reactors Limited*

One of Canada's top scientists and a leader in the metallurgical struggle to produce uranium-steel is president and managing director of Geo-Met Reactors Limited, Ottawa.

Dr. William A. Morgan resigned from his position as head of the Canadian Government's Ferrous Metals Section of the Department of Mines & Technical Surveys to assume his new appointment on September 3, 1962.

Geo-Met Reactors Limited is a metallurgical research development company devoted to the development in Canada of Canadian natural resources.

Dr. Morgan is an acknowledged authority in the uranium-steel research field. For the past two years he has conducted research activities in an attempt to use uranium as an alloying element in steel, to find new uses for uranium and to increase the strength of steel.

He supervised a team of 30 scientists and technicians in this work, which resulted in the granting to the Crown of five Canadian patents which are pending in many other countries.

The patents are for improvements in the properties of carbon steels, improvements in the machinability of steels and improvements in stainless steels.

Dr. Morgan and his associates have also carried out work on new uses for gold and columbium and this work has resulted in two further Canadian and United States patents which are pending.

He received his Bachelor of Science degree in metallurgy at the University of South Wales in 1949, and obtained his Ph.D. in metallurgy at the University of Cambridge in 1954.

A sessional lecturer in metallurgy at the University of Ottawa, he has written papers which have been published in journals of most metallurgical societies throughout the world.

Prior to coming to Canada, the 32 year-old scientist was a metallurgist with the British Iron and Steel Federation, London. He is an associate member of the Institution of Metallurgists, London, and a member of the Canadian Institute of Mining and Metallurgy, American Institute of Mining and Metallurgy, American Society for Metals, and Iron and Steel Institute, London. He is a registered professional engineer in the Province of Ontario.

Dr. Morgan is married to the former Elizabeth Megan Jones and they have two daughters, Rosamund, eight, and Deborah, four.

For recreation he likes swimming, skiing and enjoys listening to classical music.

## CLIENTS OF GEO-MET REACTORS LIMITED

Climax Molybdenum Company Limited

Department of Defense Production
Government of Canada

Masterloy Products Limited

Metal and Ore Company Limited

Metallurgical Products Limited

Mount Costigan Mines Limited

Mount Pleasant Mines Limited

Nor-Acme Mines Limited


Map showing the location of Mount Pleasant Mines, in Charlotte County, New Brunswick

(ACTUAL HEADLINES)

# Mount Pleasant Mines In Exploration Program

Geo-Met Develops Reduction Process For Tin Recovery

CANADA SEEN TIN PRODUCER

Internat Predicts

*Canada May Be Big Tin Proo*

New Moves Toward Our First

*Ottawa Professors*
Hope To Establish Tin Mine In N. B.

Mount Pleasant plans pilot plant

Usine-pilote à la mine Mount Pleasan

Canadian Tin F Would Help U

Mt. Pleasant Underground Work
Opening Series Of Tin Veins

onal Tin Expert
Maritime Industry

ucer

*Canadian Firm Getting Set*
*To Work Tin Ore Discovery*

Tin Output

Mt. Pleasant Mines Plans
Pilot Plant By End Of '63

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S.

*Revolutionary*
*Ore Process*
*Developed Here*

# AUTHORIZED CAPITALIZATION

## MOUNT PLEASANT MINES LIMITED

Two hundred thousand 5% non-cumulative redeemable preference shares, 50 cents par value, were all redeemed May 31, 1962, with none presently outstanding.

Five million common shares, no par value. Of these, 3,384,200 shares are outstanding, of which 884,000 shares were issued for property and 2,500,200 shares were issued for cash ($1,504,747).

At August 31, 1962, Mount Pleasant Mines Limited had a net cash position of $696,203, of which $300,000 was invested in short term securities at 3½ per cent.

During August, two blocks of 100,000 shares each were underwritten at $1.75 per share. One of these was exercised on August 7, 1962, due date. The second block, due November 7, 1962, was paid for in advance on August 22, 1962.

There remain under option a total of 600,000 shares which would provide the treasury with an additional $2,250,000 if all were exercised. These are:

| | |
|---|---|
| 100,000 shares @ $2.25 | $225,000 |
| 100,000 shares @ $2.75 | 275,000 |
| 150,000 shares @ $3.50 | 525,000 |
| 150,000 shares @ $4.50 | 675,000 |
| 100,000 shares @ $5.50 | 550,000 |
| | $2,250,000 |